

German Antarctic Receiving Station (GARS) O'Higgins

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Abstract

In 2005 the German Antarctic Receiving Station (GARS) in O'Higgins contributed to the IVS observing program with 8 observation sessions. Mark 5 system has been used. Remote Control Software and Hardware has been improved. A new feed ring was mounted to overcome corrosion and to keep the feed system operational. A new power generator was installed in 2004 to support the station with sufficient power all over the year. Unfortunately the electronic control system failed and the station was not powered during a period from August 23 to September 22, 2005.

1. General Information

The German Antarctic Receiving Station (GARS) is jointly operated by the Federal Agency of Cartography and Geodesy (BKG), the German Aerospace Center (DLR) and the Institute for Antarctic Research Chile (INACH). The 9m Radiotelescope at O'Higgins is used for geodetic VLBI and for Remote Sensing. The access to the station is organized campaign-wise during the Antarctic spring and summer. In 2005 the station was occupied from January to March and from October to December. DLR and BKG jointly send engineers and operators for the campaigns together with a team which maintains the infrastructure such as the provision of power etc. Special flights with "Hercules"-aircrafts and small TwinOtters-aircrafts were organized by INACH in close collaboration with the Chilean Army, Navy and Airforce in order to transport the staff, the technical material and also the food for the entire campaign from Punta Arenas via Island Frey to the station O'Higgins on the Antarctic Peninsula. Sometimes the staff and material travelled by ship to O'Higgins. Conditions and time schedule are unpredictable and require a lot of security precautions. Arrival time and departure time is strongly dependent on the weather conditions and the general logistic.

After the long Antarctic winter usually the equipment at the station has to be initialized, damages, which result from the strong winter period, have to be identified and repaired. Shipment of spare parts or material for upgrades from Germany needs careful preparation in advance, nevertheless the arrival of material at O'Higgins is often delayed.

In co-location with the 9m Radiotelescope for VLBI

- two GPS receivers are operated in the frame of IGS all over the year, an Alan Osborn ACT (OHI2), which has a long and stable history and a JAVAD receiver (OHI3) for GPS and GLONASS tracking.
- a tide gauge is installed, which has been operating for several years with some interruptions caused by destroyed cables from the scratching ice on the rocks,
- a meteorological station providing pressure, temperature and humidity and wind information, as long as the extreme conditions outside did not disturb the sensors,
- a H-Maser, a Atomic Cs-clock, a GPS time receiver and a Total Accurate Clock (TAC) are employed for the provision of the time and frequency.

The 9m Radiotelescope has a dual purpose: perform geodetic VLBI and receive the remote sensing data from ERS 2, JERS and ENVISAT. Different antenna tracking modes and different receivers have to be activated depending on the application.



Figure 1. GARS O'Higgins Radioteleskop

2. Technical Staff

The staff members for operating, maintaining and improving the GARS VLBI component and the geodetic devices are summarized in Table 1.

Table 1. Staff – members

Name	Affiliation	Function	Working for
Christian Plötz	BKG/FESG	electronic engineer	O'Higgins (responsible), RTW
Walter Schwarz	BKG	electronic engineer	RTW, O'Higgins
Reiner Wojdiak	BKG	software engineer	O'Higgins, IVS Data Center Leipzig

3. Observations in 2005

During the Antarctic summer campaign (January-March 2005) and during the Antarctic spring campaign (October-December 2005) GARS participated in the following sessions of the IVS observing program:

- 4 sessions during the period January - February (OHIG36, T2037, OHIG37, OHIG38)
- 4 sessions during the period October- December (OHIG39, OHIG40, OHIG41, T2041)

All observations were recorded on disks with Mark 5A. The data were shipped from O'Higgins to Punta Arenas with the earliest possibility after they were recorded. From Punta Arenas, the disks were shipped by regular air transportation to the correlator.

4. Maintenance

The extreme conditions in the Antarctic require special maintenance and repair of the GARS telescope and of the infrastructure. The effect of corrosion, problems with connectors and capacitors need to be detected; the H-Maser has to set up into operation mode as soon as the operators arrive. The antenna, S/X-band receiver and the data acquisition system have to be activated properly. Those components which were damaged during the previous campaign usually were replaced. In particular the damage of the control electronics of the power generator was fixed. Some work was done to maintain the containers, such as the installation of a new roof and new windows, and also the extension of the air conditioning system.

5. Technical Improvements

A special ring, which holds the foil in front of the feed, was replaced during the first campaign in 2005 due to strong corrosion. In addition the foil was replaced by a special teflon foil, which is extremely stable and needs no extra shielding during the unmanned winter period. In 2005 the Antenna Control Unit (ACU), was replaced by a completely new system built by VERTEX. This will lead to improved and undisturbed operation of the antenna in satellite mode as well as in VLBI mode.

6. Upgrade Plans for 2006

During 2006 it is planned to expand the observing capabilities in particular by extending the period of observations by employing the remote control facilities and to increase the Internet capabilities at least by a factor of two (256kbps). The upgrade to Mark 5B is planned for 2006.